

A FULL bibliography of Russian books and papers on mathematics and physical sciences since the earliest days of printing is being published at Moscow, by V. V. Bobynin. The first instalment of the second volume brings the work down to the year 1774.

IN the new number of *Harvard College Bulletin* Mr. W. H. Tillinghurst has the following note:—"It is believed that M. Chevreul reached a greater age than any other person who had received a degree from Harvard College, outliving by a year Judge Timothy Farrar (1767), born July 11, 1747, died February 21, 1849, at the age of 101 years, 7 months, 10 days, who received the degree of LL.D. in 1847 on the completion of his one hundredth year. Two graduates of American Colleges have outlived M. Chevreul. Rev. John Sawyer (Dartmouth, 1785), was born October 9, 1755, and died October 14, 1858, aged 103 years, 5 days. He received the degree of D.D. from Dartmouth in 1857, when 102 years of age. But the oldest College graduate in this country known to the writer was Nathan Birdseye (Yale, 1736), who was born August 19, 1714, and died January 28, 1818, aged 103 years, 5 months, 9 days."

SOME interesting facts concerning the "element" tellurium have been brought to light by Dr. Brauner, of Prague, during the course of a series of atomic weight determinations, an account of which is given in the July number of the *Journal of the Chemical Society*. A determination of the atomic weight of tellurium made by Berzelius in 1832 yielded the number 128.3, and a later one in 1857, by von Hauer, gave the value 127.9. Hence 128 has usually been accepted as the true atomic weight. The properties of tellurium, however, indicate that it belongs to the sulphur group of elements, and that its position in the periodic system lies between that of antimony, of atomic weight 120, and iodine, of atomic weight 127. But according to the above determinations the atomic weight of tellurium is higher than that of iodine. Hence we are obliged to admit one of two things: either that the atomic weight of pure elementary tellurium has been incorrectly determined, or that the periodic law of the elements, that grand natural generalization whose distinguished elaborator English chemists have recently been delighting to honour, breaks down in this particular case. In view of the overwhelming mass of experimental evidence which has now accumulated in support of this generalization, the latter assumption cannot for a moment be tolerated. The redetermination of Dr. Brauner becomes therefore of primary importance, and his results partake of the highest interest. The mode of procedure which afforded the most satisfactory results consisted in the analysis of tellurium tetrabromide, TeBr_4 , purified in the most complete manner, by means of silver nitrate prepared from pure silver. The mean atomic weight from these experiments was found to be 127.61, the maximum being 127.63, and the minimum 127.59. Hence there can no longer be any doubt that the substance we term tellurium does possess a combining weight larger than that of iodine. Now comes the question: Is this substance pure elementary tellurium? If it is, then, as Dr. Brauner says, it is "the first element the properties of which are not a function of its atomic weight." Dr. Brauner, however, finds as the result of a process of fractionation that it is not pure tellurium, and that it consists of probably three elements, pure tellurium mixed with smaller quantities of two other elements of higher atomic weights; and he is at present engaged in studying the nature of these foreign substances, and in the endeavour to isolate pure tellurium itself. A few of the as yet unpublished results obtained in these latter researches were communicated personally by Dr. Brauner at the meeting of the Chemical Society on June 6, and among them the interesting fact was stated that one of the new elements is probably identical with Prof.

Mendeleeff's recently predicted dwitellurium, of atomic weight 214, the other new constituent being an element closely allied to arsenic and antimony.

THE additions to the Zoological Society's Gardens during the past week include a Poë Honey-eater (*Prothemadera nova-zealandiae*) from New Zealand, presented by Mr. Alfred M. Simon; two Razorbills (*Alca torda*), two Guillemots (*Lomvia troile*), British, presented by Mr. W. B. Roberts; a White-throated Monitor (*Varanus albigularis*) from South Africa, presented by Mr. H. L. Jones; a Macaque Monkey (*Macacus cynomolgus*) from India, two Argus Pheasants (*Argus giganteus* ♂ & ♀) from Malacca, a Military Macaw (*Ara militaris*) from South America, deposited; an Indian Coucal (*Centropus rufipennis*) from India, two Diamond Snakes (*Morelia spilotes*) from New South Wales, received in exchange.

OUR ASTRONOMICAL COLUMN.

COMET 1889 d (BROOKS, JULY 6).—The comet reported in NATURE of July 11 (p. 255) as having been discovered by Swift on July 5 appears to have been an observation of Barnard's comet of 1888 September 2, there having been an error in the transmitted position. The position should have been:—

R.A. 21h. 24m. 20s. N.P.D. 89° 11'.

A faint comet was discovered by Brooks on July 6.

July 6^h 790 G.M.T.: R.A. 23h. 44m. 8s.; N.P.D. 99° 9'. A rough approximation by Brooks.

July 8^h 9561 G.M.T.: R.A. 23° 46' 26"; N.P.D. 98° 55' 57". Observation by Barnard. Comet, slightly elongated, 1' in diameter, 11 mag. or fainter.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1889 JULY 21-27.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on July 21

Sun rises, 4h. 10m.; souths, 12h. 6m. 8.4s.; daily increase of southing, 2.8s.; sets, 20h. 1m.: right asc. on meridian, 8h. 3.9m.; decl. 20° 24' N. Sidereal Time at Sunset, 16h. 0m.

Moon (two days after Last Quarter) rises, 23h. 54m.*; souths, 7h. 0m.; sets, 14h. 19m.: right asc. on meridian, 2h. 56.6m.; decl. 12° 12' N.

Planet.	Rises.		Souths.		Sets.		Right asc. and declination on meridian.	
	h.	m.	h.	m.	h.	m.	h.	m.
Mercury..	2	42	10	51	19	0	6 49.0	22 23 N.
Venus.....	1	4	8	53	16	42	4 49.9	19 22 N.
Mars.....	3	13	11	25	19	39	7 23.5	23 0 N.
Jupiter....	18	7	22	1	1	55*	18 0.9	23 21 S.
Saturn....	6	9	13	35	21	1	9 33.3	15 43 N.
Uranus....	11	39	17	9	22	39	13 8.0	6 34 S.
Neptune..	0	23	8	12	16	1	4 9.1	19 22 N.

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Star.	R.A.		Decl.		h.	m.
	h.	m.	h.	m.		
δ Libræ ...	14	55.1	8	5 S.	July 25,	2 57 m
U Coronæ ...	15	13.7	32	3 N.	27,	2 38 m
U Herculis ...	16	20.9	19	9 N.	22,	m
U Ophiuchi ...	17	10.9	1	20 N.	23, 22	31 m
X Sagittarii ...	17	40.6	27	47 S.	21, 23	0 M
W Sagittarii ...	17	57.9	29	35 S.	23, 23	0 M
U Sagittarii ...	18	25.6	19	12 S.	26, 1	0 m
R Scuti ...	18	41.6	5	50 S.	23,	M
β Lyræ ...	18	46.0	33	14 N.	24, 23	30 M
R Lyræ ...	18	52.0	43	48 N.	21,	M
U Aquilæ ...	19	23.4	7	16 S.	24, 21	0 m
η Aquilæ ...	19	46.8	0	43 N.	26, 23	0 M
S Delphini ...	20	38.0	16	41 N.	26,	M
X Cygni ...	20	39.1	35	11 N.	24, 2	0 M
T Vulpeculæ ...	20	46.8	27	50 N.	21, 23	0 m
δ Cephei ...	22	25.1	57	51 N.	23, 0	0 m

M signifies maximum; m minimum.

July.	h.		
23	...	21	...
			Venus in conjunction with and $0^{\circ} 41'$ south of the Moon.
26	...	20	...
			Mercury in conjunction with and $0^{\circ} 19'$ south of the Moon.
26	...	23	...
			Mars in conjunction with and $0^{\circ} 1'$ south of the Moon.

Meteor-Showers.

R.A. Decl.

Near γ Draconis	...	...	270	...	50	N.	...	Swift.
From Lacerta	...	...	335	...	50	N.	...	Swift.
			350	...	52	N.	...	Very swift.

BABYLONIAN ASTRONOMY.¹

III.

WHEN names had to be given to stars, the Babylonians naturally took them from the objects around themselves. The heavenly host was compared to an immense flock, and several stars were grouped together to form the imaginary figure of either a bull, or a ram, or a goat, &c. It is too often taken for granted that the constellations have received certain names, and that the march of the sun through these signs has given birth to various legends, but those who see everywhere solar myths do not say why the constellations were so named. The names given to them must have some connection with what took place at their appearance, mark the seasons, or indicate the work, agricultural or other, of the seasons. The stars of the ecliptic, placed on the path of the planets, were associated with the monthly motion of the moon, and divided accordingly into thirty groups. Each of these constellations was one of the houses of the moon, and marked in the sky the course followed by it in one day.

The constellations were but indirectly connected with the sun's journey through the ecliptic. The acronic, not the heliac, rising of the stars and signs was especially observed, for those which were shining all through the nights of a certain period were considered as the protecting gods of that period.

Many of the allegorical figures representing the constellations were engraved on the boundary stones as images of protecting divinities, and they show the process by which the Babylonian artists arrived at the creation of the composite animals that still adorn our celestial globes. For instance, the Goat coming after Aquarius was represented as coming out of the water, and the hind part of its body changed into that of a fish. Sometimes three or more constellations were combined to form one figure: the horse, the scorpion, and the bow gave birth to a Centaur, holding a bow, and having a scorpion's tail—our Sagittarius.

When the zodiac was borrowed from Babylonia by the Egyptians, they adopted these very un-Egyptian images. There is still some uncertainty as to the date at which the borrowing took place, for all the Egyptian zodiacal representations are posterior to Alexander, but the idea may have been imported about 1600 or 1500 B.C. The Egyptians did not borrow bodily, however, the Babylonian zodiac of thirty signs, but adapted it to their solar year, and according to their sun-worship ideas, so the thirty signs were reduced to twelve, and were connected with the sun's march through the ecliptic. The thirty-six decans were in the same way connected with the sun's march, and three given to every month or ecliptic constellation, one therefore marking the space covered by the sun in ten days.

All attempts made as yet to identify the Babylonian names of stars have failed, because there was no base or starting-point. But now, with the list of the thirty constellations answering to the thirty divisions of the sky, identification is practically easy. In this work we are also helped by the classifications made by the augurs of Babylon for omen-taking; for instance, the twelve stars of the south must be stars of the austral hemisphere. We must at the same time take into account any mention made of stars in the inscriptions, and not forget that the acronic rising was the one observed and noticed by the Babylonians. By this comparative method it can be determined, for instance, that the star *Sukudu* or *Kak-si-di* was Sirius, for we are told that it was one of the seven most brilliant stars, and a star of the south; as it does not appear in the list of the thirty groups of

stars, marking the path of the moon, it must be at a certain distance from the ecliptic. In several inscriptions the appearance of this star is used to determine a date; it must therefore appear only for a very short period. This same star is also called "directing star," because connected with the beginning of the year.

By a similar process we can determine that the star *Su-gi* was Canopus; the star *Iku* (or *Dil-gan*), Fomalhaut; the star *Sibzi-an-na*, a Centauri; the star *Id-khu*, Altair; &c.

The thirty constellations dividing the ecliptic are not, however, all exactly on this line; for instance, one of them is *Sar* or *Merodach* (Orion), another is "the Sceptre of Bel" (Procyon). Having once identified several of these thirty constellations or stars, it is easy to identify the others, as the list is given in the tablet according to their order. We are also helped in our work of identification by the Egyptian zodiac, and the names preserved by Ptolemy. In Egypt, Merodach has become Horus, and the "Sceptre of Bel" that of Osiris. In some cases we can even identify the name of a constellation, though we are not able to pronounce it on account of its being written with a group of ideograms.

The Babylonians often, in star nomenclature, confounded a star with the constellation it belonged to, and substituted for the name of a star that of the god associated with it. We must also take into account the two different points of view adopted by the Babylonian astronomers and their Egyptian imitators.

SCIENTIFIC SERIALS.

Revue d'Anthropologie, troisième série, tome iv., troisième fasc. (Paris, 1889).—Examination of human bones found by M. Piette in the walled-in cave at Gourdon, by Dr. Hamy. The results of M. Piette's explorations, although of some interest, have not contributed very largely to our acquaintance with human fossil bones, owing to the fractured and mutilated condition of these finds, which, as is often the case in cave-deposits, were limited to cranial bones, the maxillaries, and one or two of the upper cervical vertebrae. The most perfect of these were found in the middle of the walled cave in *débris* of reindeer and other animal bones, together with carved reindeer horns, cut flints and stones, and numerous stone hatchets, chisels, scrapers, &c., these remains being similar to objects found in other prehistoric stations in the south of France belonging to the reindeer period in Central Europe. At a more remote part of the cave M. Piette discovered a deposit, containing implements of a more ancient type, intermingled with the bones of the mammoth and bear, as well as of the reindeer. The human lower-jaw, found here at a depth of 15 feet, has the special character of analogous cranial remains derived from the Naulette and Spy caves, and belonging to the most ancient type of primæval man, whom MM. De Quatrefages and Hamy include under the name of the Canstadt race.—On the gold of ancient Gaul, by M. Cartailhac. The writer gives a detailed account, with numerous illustrations, of the various gold ornaments found in France, and shows how numerous are the instances in which large and splendid treasures of older art have been irreparably lost in consequence of the finders having consigned them to the melting-pot of the local goldsmith, a practice which can only be stopped by an alteration in the state of the law regarding treasure-trove. The extreme beauty of some of the bracelets, necklets, &c., and the unique character of their ornamentation, are unsurpassed by other objects of the same kind found in different parts of Europe.—Notes on the colour of the eyes and hair in Norway, by Drs. Abbo and Faye, with tables and annotations, by M. Topinard. From these reports it appears that the population of Norway exhibits a higher percentage (97.25) of light eyes than any other country in Europe. Flaxen hair occurs in 57.5 per cent. of the people of the northern provinces, and while absolutely black hair is found only in the ratio of 2 per cent., red hair does not rise higher than 1.5 per cent. in the scale of hair-coloration.—Kashgaria, by Dr. Seeland. In this notice the writer records the incidents of his journey from Kashgar to Ak-Sou, over a distance of more than 350 miles along the sandy ill-kept track that constitutes the principal military Chinese post road. The narrative lacks the interest of the previous numbers already referred to in this journal.—On the cephalic index of the Provencal population, by M. Fallot, with tables referring to the several departments, which give the varying maxima and minima in accordance with special cranial

¹ Abstract of the third lecture delivered by Mr. G. Bertin, at the British Museum. Continued from p. 261.